Chemical Resistance Chart
For Protectowire Type XCR Jacket Material

Protectowire Type XCR demonstrates excellent overall chemical resistance. In general only a few species are known to chemically attack the jacket and significantly swell the polymer causing damage to the jacket material.

The XCR fluoropolymer jacket is especially resistant to:

- strong and weak inorganic acids and bases,
- weak organic acids and bases,
- salts, aliphatic hydrocarbons, alcohols,
- strong oxidants and halogens.

However, some chemicals can attack and swell the XCR jacket, particularly at high temperature:

- esters, aromatic hydrocarbons, amines, gaseous fluorine,
- ethers, ketones, amides, partially halogenated solvents and certain halogenated compounds.

Chemical attack and jacket swelling are very complex phenomena. A partial list of factors affecting chemical suitability of all Protectowire Linear Heat Detector jacket materials for chemical applications are as follows:

- Specific chemical or mixture composition,
- Temperature and temperature variation,
- Concentration of the attacking chemical which may be a complex completely different than the individual components,
- Exothermic heat or mixing pressure due to the effect of pressure on a reactive gas,
- Time of exposure, velocity, or material thickness.

The recommended procedure to determine suitability of Protectowire jacket materials is as follows:

- Determine as accurately as possible the chemicals in the application in question,
- Determine the maximum temperature and the normal operating temperature,
- Review the chemical effect ratings including the maximum recommended temperature from the charts provided.

The maximum recommended temperatures listed in the XCR Chemical Resistance Chart refers to the point at which the chemicals indicated would damage the jacket material. These temperatures have no relationship to the alarm temperature of the Detector, but should be referenced to determine if limitations to the maximum recommended ambient temperature for the Detector is necessary in chemical environments. Any breach or adverse chemical effect on the integrity of the Protectowire jacket, will lead to premature detector failure and a reduced service life for the product.

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Manufacturer of
Special Hazard
Fire Detection Systems

An ISO 9001 Registered Company

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This chemical resistance chart cannot predict the effect on the jacket of complex chemical mixtures. The appropriate chemical resistance tests using a representative sample of the chemical(s) or a trial installation of the Protectowire Linear Heat Detector should be performed to determine acceptable product performance.

Chemical	Formula	Concentration	Max. Temp. [°C]
Acids			
Hydrochloric	HCl	37%	150
Hydrofluoric	HF	50%	150
Nitric	HNO_3	65%	66
Phosphoric	H_3PO_4	85%	150
Sulphuric	H_2SO_4	98%	23
Bases			
Ammonium hydroxide	$NH_4(OH)$	30%	150
Potassium hydroxide	KOH	30%	121
Sodium hydroxide	NaOH	50%	121
Sodium hypochlorite	NaClO	5%-stabilized at pH 12	150
Hydrocarbons			
n-Hexane	$CH_3(CH_2)_4CH_3$	100%	150
Toluene	$C_6H_5CH_3$	100%	66
Alcohols and Ethers			
Methanol	CH_3OH	100%	65
Ethanol	CH_3CH_2OH	100%	140
Organic Acids, Esters and Ketones			
Acetic acid	CH_3COOH	100% 50%	>100 >121
Acetone	CH_3COCH_3	100%	66
Acetophenone	$C_6H_5COCH_3$	100%	50
Ethyl Acetate	$CH_3COOCH_2CH_3$	100%	50
Classic Polymer Solvents			
Dimethyl formamide	$CH_3CON(CH_3)_2$	100%	50
Dimethyl sulphoxide	CH_3SOCH_3	100%	>100
N-Methylpyrrolidone		100%	25
Halogenated Solvents			
Chlorobenzene	C_6H_5Cl	100%	66
Chloroform	$CHCl_3$	100%	Not resistant
Amines and Nitriles			
Acetonitrile	CH_3CN	100%	>100
Aniline	$C_6H_5NH_2$	100%	100
Dimethyl amine	$(CH_3)_2NH$	100%	25
Peroxides			
Hydrogen peroxide	H_2O_2	30%	>88
Automotive Fluids			
Crude Oil		100%	150
Dexron II (gear oil)		100%	150
Gasoline		100%	150
Diesel Fuels		100%	150
Mineral Oil		100%	150

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